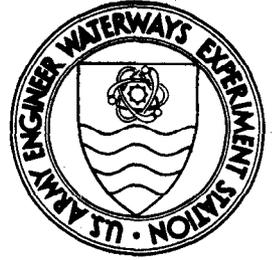


DREDGED MATERIAL RESEARCH PROGRAM



TECHNICAL REPORT D-78-48

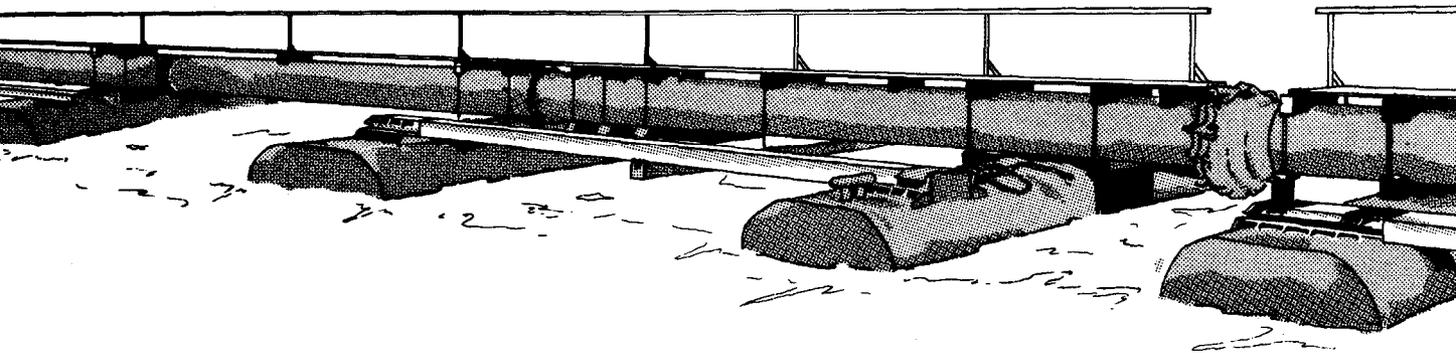
AN INVESTIGATION OF PHYSICAL CHEMICAL, AND/OR BIOLOGICAL CONTROL OF MOSQUITOES IN DREDGED MATERIAL DISPOSAL AREAS

by

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30 September 1978

SUBJECT: Transmittal of Technical Report D-78-48

TO: All Report Recipients

1. The report transmitted herewith represents the results of one of the research efforts accomplished as part of Task 2C (Containment Area Operations) of the Corps of Engineers' Dredged Material Research Program (DMRP). Task 2C was part of the DMRP Disposal Operations Project and, among other considerations, included research into various ways of improving the efficiency and acceptability of facilities for confining dredged material on land.
2. Confining dredged material on land is a relatively recent disposal alternative to which practically no specific design or construction improvement investigations had been addressed prior to the DMRP. Being a form of a waste-product disposal, dredged material placement on land has seldom been evaluated on other than purely economic grounds with emphasis nearly always on lowest possible cost. In the last several years, there has been a dramatic increase in the amount of land disposal necessitated by confining dredged material. Attention necessarily is directed more and more to the environmental consequences of this disposal alternative and methods for minimizing adverse environmental impacts.
3. Several DMRP work units have been designed to investigate improved facility design and construction including methods of considering and minimizing adverse environmental impacts during the design, construction, and management phases of the disposal area. An earlier DMRP study identified mosquitoes as being a potential problem associated with the confinement of dredged material. Consequently, this detailed study was undertaken by The Citadel, the Military College of South Carolina, to provide an understanding of the problem and to develop methods of reducing or eliminating mosquitoes associated with confined dredged material disposal areas.
4. Studies were conducted on the ecology and control of mosquitoes developing within dredged material disposal sites at coastal locations in several Corps of Engineers Districts. The investigation consisted of the following major phases: all known literature citing association of

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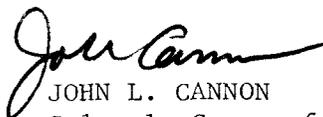
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mosquitoes and disposal areas was reviewed; a national survey of the attitudes and opinions of personnel from local mosquito-abatement districts, selected CE Districts, and State vector-control agencies was analyzed using national and regional controls; and an arthropod successional pattern was postulated based on soil weathering patterns.

5. Emergency traps were used to study arthropods associated with dredged material of various ages; studies were made comparing adult mosquito activity with selected weather variables. Results of limited tests using two insect-growth regulator (IGR) compounds are presented. More extensive tests were conducted using physical control measures including the use of rim-ditching techniques and the use of the Riverine Utility Craft or RUC. A listing of plant successional patterns, plant species associated with mosquito larvae, standing crop estimations, and species composition data from disposal sites is presented. Ornithological studies considered the species composition of birds utilizing disposal sites as a major part of mosquito ecology. Suggestions on mosquito test management plans, interagency cooperation, and future research are presented in the report.

6. The results of this study and the guidelines presented herein should provide the user with the ability to analyze mosquito problems associated with specific confined dredged material disposal areas. Guidelines on mosquito control during the planning, design, construction, and management of disposal areas should always be considered.



JOHN L. CANNON
Colonel, Corps of Engineers
Commander and Director

20. ABSTRACT (Continued).

State vector control agencies was analyzed using national and regional controls. Studies on factors affecting the ecology of all arthropods within disposal sites were initiated including soil and water characterizations. An arthropod successional pattern was postulated based on soil weathering patterns. Emergence traps were used to study arthropods associated with dredged material of varying ages. Mosquitoes were collected from disposal sites as larvae and adults and identified. Studies were made comparing adult mosquito activity with selected weather variables. Site visitations were conducted to eight CE Districts where additional observations and collections were made. Comments were made regarding three types of mosquito control (chemical, physical, and biological) possibilities within dredged material disposal areas. Results of limited tests using two insect growth regulator (IGR) compounds are presented. More extensive tests were conducted using physical control measures, including the use of rim ditching techniques and the use of the riverine utility craft (RUC). Botanical studies were conducted concurrently with mosquito investigations. A listing of plant successional patterns, plant species associated with mosquito larvae, standing crop estimations, and species composition data from disposal sites is presented. Ornithological studies considered the species composition of birds utilizing disposal sites. Suggestions on mosquito pest management plans, interagency cooperation, and future research are stated with concluding remarks.

Appendix A presents the interagency perspectives on mosquito conditions and control in confined dredged material disposal sites. Appendix B lists significant data by regions, and Appendix C lists all mosquito species known to be associated with dredged material disposal sites. Appendix D summarizes the site visitations to the CE Districts, and Appendix E discusses the vegetation analysis of diked dredged material disposal sites. Appendix F presents a discussion of the occurrence of avian species within dredged material disposal sites.

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